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II.—Notes on Carboniferous Polyzoa

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thing may be found in it worthy of imitation, however much may be considered faulty or imperfect. What is desired by naturalists I have taken as my text in the first part of this paper—"a uniform method of registration;" and that is what I desire, however far short of perfection my own plan may be considered*.

In conclusion, I wish especially to thank Prof. Newton for his ever ready and obliging communications in this connexion, and I have also to acknowledge with thanks letters from the following gentlemen, in answer to inquiries made regarding the distribution of the birds of Northern Europe, viz. to Herr A. G. Nordvi of Vadsö, Dr. Meves of Stockholm, Prof. A. J. Friis and Herr R. Collett of Christiania, and to Prof. Palmén of Helsingfors. To the courtesy of the two latter gentlemen I am greatly indebted for much useful information bearing upon my subject, as well as for copies of several books and papers upon the birds of Finland and Norway. I need scarcely add that I shall be most grateful for any assistance these or other naturalists will afford me in my subject in the future.

[To be concluded with Part III.]

POSTSCRIPT.

Phylloscopus borealis, Blas. No. 115 in Table.

Dr. Meves informs me (*in lit.*) that this interesting species has been found last summer (1876) in Northern Onega, and also in the Kola peninsula, by the collectors employed by Lieut. Sandeberg.

ERRATUM IN PART I.

Page 285. Transpose the names *Plectrophanes lapponicus* (L.) and *Plectrophanes nivalis* (L.), Nos. 35 and 36. The records applied to the former in both Tables belong to the latter, and *vice versa*.

II.—Notes on *Carboniferous Polyzoa*.

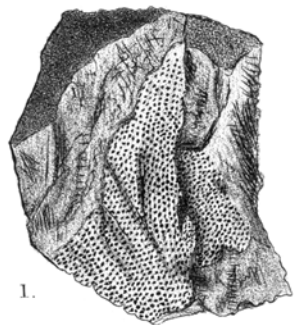
By R. ETHERIDGE, jun., F.G.S.

[Plate II. A.]

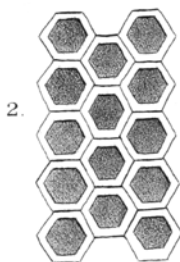
A LARGE collection of Carboniferous Polyzoa has lately been made by Mr. James Bennie for the Geological Survey of Scotland, from Mid and East Lothian. From my notes on this collection I extract the following descriptions.

* For the guidance of those, if such there may be, who approve of this method, I may mention here that the minor details of work, such as collecting the records and tabulating them for use, will be found in a paper read by me before the Glasgow Natural-History Society, and which, I understand, will shortly appear in their Proceedings for Session 1876-77, entitled "On uniformity of Method in recording Natural-History Observations, especially as regards Distribution and Migration," &c.

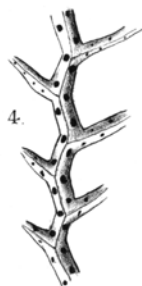
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2.



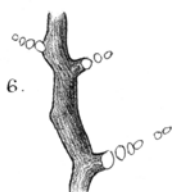
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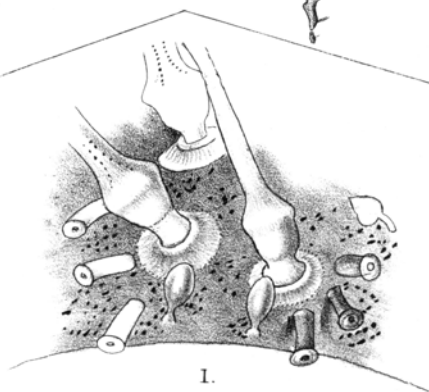
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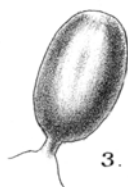
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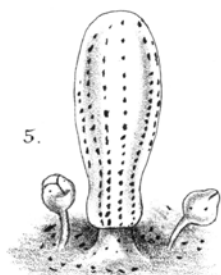
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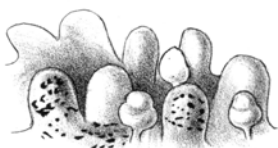
2.



3.



5.



4.



6.

B

Genus FENESTELLA (Miller), Lonsdale, 1839.
(Murchison's Silurian System, p. 677; King, restricted,
Perm. Foss. England, 1850, p. 35.)

Fenestella arctica, Salter, var. *scotica*, var. nov.
(Plate II. A. figs. 1 & 2.)

Fenestella arctica, Salter, Belcher's Last of the Arctic Voyages, 1855,
vol. ii. p. 385, t. 36. f. 8.

Spec. char. "Portions of foliaceous plane fronds, which must have measured several inches across. The branches are thicker than broad, rounded on the non-poriferous face, slightly but regularly zigzag, and fully a third of a line broad; they are regularly radiating and bifurcating over the general surface; irregular, and some of them much thicker, below. Fenestrules broad, oval, a line long, and fully twice the width of the branches. They are very regular in size and shape, those at the bifurcation of the branches being similar and equal to the rest. Non-poriferous face very slightly striated, appearing smooth to the eye; pores —?"

Obs. I have lately had an opportunity of examining some examples of this species from the Arctic regions, collected by Captain H. W. Feilden, R.A., naturalist to the late Arctic Expedition, which has enabled me to name certain examples of a *Fenestella* from our Lower Limestone group which I had placed on one side for investigation. The diagnosis given within inverted commas comprises the characters assigned by Mr. Salter to his species; but when a description can be drawn up from Captain Feilden's specimens the specific characters will have to be much augmented and better defined. The essential characters of the species, however, as defined by Salter, are the zigzag interstices, giving rise to hexagonal fenestrules, and their extreme regularity and similar disposition. The variety has essentially all the characters of the species [the Arctic form], but simply on a finer and smaller scale; the hexagonal fenestrules are much smaller, and perhaps the interstices and dissepiments proportionally wider as compared with the size of the former. These data are certainly not of specific value, but will serve well as varietal characters. The fine striæ of the non-poriferous face of the Arctic form are not visible on the variety; that surface of the latter appears to be quite plain.

Without doubt there is a close resemblance between *F. arctica*, Salter, and *F. (Retepora) prisca*, Goldfuss. However, neither in the figure given by Dr. Goldfuss*, nor in that given

* Petrefacta Germaniæ, vol. i. t. 36. f. 19.

by Prof. H. A. Nicholson*, are the interstices so sharply zigzag, but more undulating; the fenestrules also are a long oval, and lack the characteristic hexagonal form of *F. arctica*. It must, however, not be forgotten that these fenestrules are described by Prof. M'Coy as "very obscurely hexagonal"†.

Locality and Horizon. Currielee Quarry no. 2, Tyne Water, Edinburghshire, impure limestone, 20 to 30 feet above the no. 2 limestone of the Lower Carboniferous Limestone group.

Collector. Mr. James Bennie.

Genus GLAUCONOME (Goldfuss), Lonsdale, 1839.

Glaucome, Goldf. (pars) *Petrefacta Germaniæ*, p. 217 (*G. disticha*); Lonsdale, 1839, Murchison's *Silurian System*, p. 677; M'Coy, 1844, *Synop. Carb. Foss. Ireland*, p. 198.

Acanthocladia, King, 1849, *Ann. Nat. Hist.* 2nd ser. iii. p. 389; 1850, *Permian Foss. England*, p. 47.

Penniretepora, D'Orb. 1849, *Prod. de Pal.* i. p. 45.

Gen. char. Polyzoarium shrub-like or dendriform, with non-anastomosing bilaterally symmetrical stems and branches, all more or less in one plane; celluliferous on one face only. Main stem giving off occasional secondary stems, similar and equal to itself. Branches varying in length, simple or bilaterally branched, passing from the stems at a right angle or an angle less than a right angle. Cell-apertures arranged on the stems and branches in longitudinal series, the latter usually separated from one another by a keel or dividing ridge more or less developed according to species; cell-mouths with plain or elevated margins, sometimes radiately denticulated. Celluliferous face sometimes ornamented with faint striæ and small nodes variously arranged on the longitudinal keels. Reverse striated or otherwise ornamented.

Obs. The term *Glaucome* was first used by Münster in Goldfuss's fine work for four‡ species of cylindrical Polyzoa having cell-apertures distributed on all sides of the polyzoarium, viz. *G. marginata*, *G. rhombifera*, *G. tetragona*, and *G. hexagona*, of which the first may be taken as the type. A fifth species was subsequently added under the name of *G. disticha*§. The date of publication of the '*Petrefacta Germaniæ*,' or, at any rate, of that part of it containing the descriptions and figures of the forms in question, is variously

* Report Pal. Province of Ontario, 1874, i. p. 101.

† Brit. Pal. Foss. p. 76.

‡ *Petrefacta Germaniæ*, p. 100, t. 36.

§ Ib. p. 217, t. 65. f. 15.

given. By Agassiz* it is said to be 1826, by D'Orbigny at the end of 1829†, and by Stoliczka 1827‡. The four first-described species were referred by De Blainville§ and Milne-Edwards|| to the genus *Vincularia*, Defrance, published in the 'Dictionnaire des Sciences Naturelles' in 1829¶; and, in fact, not only were the species referred by these authors, but they appear to have made the genera synonymous, retaining, however, the latter term *Vincularia*. The fifth Palæozoic species, previously mentioned, was shown by Mr. Lonsdale to possess characters at variance with those assigned by Münster to the four earlier-described forms, insomuch that it possessed cell-apertures opening on one face of the polyzoarium only. For this type Lonsdale retained the abolished name *Glaucosome* and generically redefined it**. It has been so used by Prof. M'Coy and other British palæontologists, and in truth, forms a very convenient Palæozoic genus. In his Index Palæontologicus ††, Dr. Bronn committed the mistake of mixing up, under the name *Glaucosome*, the four vinculiform species of Münster, the fifth (retained by Lonsdale as typical of the redefined genus), and some others—an error which, however, was rectified in the 'Lethæa Geognostica' ‡‡, where *Glaucosome* is limited and definitely placed as a synonym of *Vincularia*, Defrance. D'Orbigny rejected the name *Glaucosome* and made it a synonym of *Vincularia*, Defrance, for three reasons—chiefly on account of uncertain date of publication, because it was announced (as he thought) later than *Vincularia*, and, lastly, the term had already been preoccupied by Gray for a genus of Mollusca§§. He further states that the plate upon which the figures were delineated was unaccompanied by text, and that *Glaucosome* "fut peut-être publié à la fin de 1829, certainement après le genre *Vincularia* de Defrance." On the other hand, Prof. W. King has passed over the claims of Lonsdale's redefinition of *Glaucosome* as to generic rank, and proposed in its place the name *Acanthocladia*, which has been pretty generally adopted by continental writers on Permian palæontology, although not universally so. The Chevalier d'Eichwald has also split up

* Nomenclator Zoologicus, Polypi, p. 12.

† Pal. Franç. Terr. Crét. v. p. 58.

‡ Pal. Neu-Seeland, 1865, pp. 144, 145.

§ Man. d'Actinologie, 1834, p. 454.

|| Lamarck's Hist. Nat. Animaux s. Vertèb. 2nd ed. ii. p. 193 (*vide* Lonsdale).

¶ T. lviii. p. 214.

** Murchison's Silurian Syst. 1839, p. 677.

†† Nomenclator, 1848, p. 531.

‡‡ Band iii. Theil 5, p. 99.

§§ Pal. Franç. Terr. Crét. v. p. 59.

Glaucanome into two sections: as defined by Lonsdale he has referred it to *Acanthocladia*, King, whilst another portion, embracing the Tertiary species of Münster, is made equivalent to *Vincularia*, DeFrance*. Lastly, Dr. Stoliczka†, so far as I understand him, appears to consider *Glaucanome*, Münster, identical with *Salicornaria*, Cuvier, 1817‡, and not with *Vincularia*, which he retains as a separate genus§.

It will be apparent from the foregoing remarks that considerable difference of opinion has existed both as regards the date of publication of *Glaucanome*, Münster, and its value as a genus. I think it is tolerably clear that its publication took place between the years 1826–29; probably Dr. Stoliczka is near the mark in saying 1827, notwithstanding D'Orbigny's statement to the contrary. Such being the case, it would have precedence over *Vincularia*, DeFrance; and this I think it undoubtedly has, instead of becoming a synonym of that genus, as placed by De Blainville, Milne-Edwards, D'Orbigny, Bronn, and others. This has been brought forward with much force by the late Dr. Stoliczka.

It was probably in view of this confusion that Prof. W. King proposed the name *Acanthocladia*; and it becomes an open question whether we ought not to employ it for such forms as those now under consideration instead of *Glaucanome*, Lonsdale. On the other hand the latter has become so universally used for Polyzoa of the type of *G. disticha*, Münster, especially in this country and America, and has amongst continental writers so much fallen into disuse (whether rightly so or not is the question) for those of the type of *G. marginata* and *G. hexagona*, that I think we may, pending further information, adopt Lonsdale's redefinition for Palæozoic forms of the *G. disticha* type. This will become perfectly feasible if, as Dr. Stoliczka says, *Glaucanome*, Münster (as typified by *G. tetragona*), is equivalent to *Salicornaria*, Cuvier; but of this I have not seen any confirmation. If, on the contrary, Dr. Stoliczka is not correct in this, then *Glaucanome* must be regarded as having priority over *Vincularia*. From this point of view *Glaucanome*, Lonsdale, becomes *nil*, and *Acanthocladia*, King, will have to be adopted for the Palæozoic forms. The whole question, however, requires further elucidation.

Synonymous with *Glaucanome*, Lonsdale, and *Acanthocladia*, King, is D'Orbigny's *Penniretepora*, a more extended descrip-

* Lethæa Rossica, 1860, i. pp. 384, 399.

† Pal. Neu-Seeland, 1865, p. 144.

‡ Règne Animal. iv. p. 75.

§ Pal. Neu-Seeland, 1865, p. 152.

tion of which, than the original, will be found in the 'Cours élémentaire de Paléontologie' *.

Dr. J. E. Gray used the term *Glaucanome*, in 1828 or 1829, for a freshwater genus of Veneridæ †, but afterwards appears to have abandoned it; and either he or Bronn proposed in its place that of *Glaucomya* or *Glauconomya* ‡.

Glaucanome elegantula, sp. nov. (Pl. II. A. figs. 3-6.)

Spec. char. Polyzoarium bipinnate; main stem and secondary stems zigzag, giving off at each angle a simple lateral branch inclined upwards. Obverse of the stems and branches angular; reverse rounded or flattened, with longitudinal microscopic striæ. Cell-apertures arranged in a single line on each half of the angular stems and branches, those of one line alternating with those of the other; on the stems there are three between every two branches on each side; on the branches they are in an unbroken series; in all the margins are level with the general surface of the stem or branch, as the case may be, as there is no evidence of any rim or projecting lip.

Obs. This very small and elegant species of *Glaucanome* has come under my notice both from the Carboniferous series of the north of England and south of Scotland. I first observed it on some shale sent to me by Mr. Hugh Miller, F.G.S., and afterwards in greater quantity on the surface of weathered shale collected by Mr. Bennie. The figured specimen is simply pinnate, but we have in the Survey collection a bipinnate example, from which the above description is taken. When the outer layer is removed from the non-celluliferous face the bases of the cells are seen following one another in close succession and in an unbroken line (figs. 5 & 6), and would give rise to the idea that a similar disposition would be found on the obverse. On the latter, however, the cells are arranged in two alternating lines, one on each of the angular faces—the first cell, as it rises from the basal layer, passing to the right, the second to the left, the third to right again, and so on throughout the whole stem. Having failed, after a careful search, to find any published description of a *Glaucanome* suitable for the reception of this form, I have assigned to it the above name.

* 1852, vol. ii. p. 104.

† Spicilegia Zoologica, 4to (1828 or 1829 ?), No. 1, p. 6.

‡ Bronn, "Index Pal." 'Nomenclator,' 1848, p. 531; Woodward, 'Man, Mollusca,' 2nd ed. p. 477; Stoliczka, 'Pal. Indica,' iii. p. 91; Pictet, 'Traité de Pal.' iii. p. 462.

Localities and Horizon. Carboniferous shale, Hopeshield Burn, near Mount Farin, Northumberland, probably near the horizon of the Scar Limestone; shale above the no. 1 or 2 limestone, Lower Carboniferous Limestone group, Harelaw Quarry, near Longniddry Station, Haddingtonshire.

Collectors. Mr. Hugh Miller, F.G.S., and Mr. James Bennie.

Genus THAMNISCUS, King, 1849.

(Annals Nat. Hist. 1849, iii. p. 389).

Thamniscus pustulata, R. Eth., jun.

Polypora ? *pustulata*, R. Etheridge, jun., Mem. Geol. Survey Scotland, Expl. 23, 1873, p. 102.

Thamniscus Rankini, Young and Young, Annals Nat. Hist. 1875, xv. p. 335, pl. 9 bis.

Obs. In 1874 I described, in the explanation to sheet 23 of the one-inch Geological-Survey Map of Scotland, certain fragments of Carboniferous Polyzoa which I believed to be new, with the remark "if it be a new species of *Polypora*, I would propose for it the specific designation of *P. pustulata*." I also pointed out that the disposition of the cells and mode of branching were exceedingly like those seen in the type species of *Thamniscus*, *T. dubius*, Schl., and suggested that it might be a species of this genus.

Since my notice of the fossil appeared, the Messrs. Young have obtained a comparatively perfect example, and have shown that it should be more properly referred to *Thamniscus*, as I surmised; but at the same time these authors have altered the name to *T. Rankini*—quite an unnecessary proceeding; for I gave a perfectly intelligible description, and my specific name is to all intents and purposes a good one.

Genus RHOMBOPORA, Meek.

Rhombopora, Meek, 1872, Hayden's Final Report of the U.S. Geol. Survey of Nebraska, p. 141.

I would draw the attention of British palæontologists to the above genus of the late Mr. Meek, referred by him to the "*Polypi*" (Actinozoa), but which will, I think, probably prove to be a Polyzoan. The genus was established for small ramose corals with "non-septate, short, tubular cells radiating obliquely outward and upward on all sides from an imaginary axis; cell-mouths rhombic or rhombic oval, and very irregularly arranged in longitudinal and oblique spiral rows, the former

of which are sometimes separated by more or less flexuous longitudinal ridges; interspaces usually rather thick, and not pierced by transverse pores, but occupied by very minute, non-septate longitudinal cells that are closed and represented at the surface by minute granules or spinules."

Mr. Meek considered that *Millepora rhombifera*, Phill., *Vincularia ornata*, Eichw., and *Favosites serialis*, Portlock, might, "with much confidence, be included in this genus." The first of these has been shown by the Messrs. Young to be a species of their genus *Rhabdomeson*; but with regard to the others I am not in a position to form an opinion. Mr. Meek concluded his description with this remark:—"Although some species of this genus [*Rhombopora*] have been referred to Goldfuss's genus *Vincularia*, they are widely removed from the typical Cretaceous species of that genus." I think it probable that *Rhombopora* will be found a very convenient one for numerous small Polyzoa of our Carboniferous and, perhaps, Silurian rocks, the generic affinities of which have often been a stumbling-block to authors. The relation of *Rhombopora* to *Vincularia* requires investigation; but I would in the mean time suggest an examination (to those who have well-preserved specimens) of the following species:—*Vincularia ornata*, Eichw.; *V. muricata*, Eichw.; *V. Benniei*, mihi; *Ceriopora hamiltonensis*, Nicholson; *Millepora interporosa*, Phill.; *M. oculata*, Phill.; *M. spicularis*, Phill.; and *M. similis*, Phill.

Rhombopora has been adopted by Dr. Toulou* for certain forms from the Permian-Carboniferous rocks of Spitzbergen.

EXPLANATION OF PLATE II. A.

- Fig. 1.* *Fenestella arctica*, Salter, var. *scotica*, R. Eth., Lower Carboniferous Limestone group, Curriee Quarry, Edinburghshire. Nat. size.
- Fig. 2.* A small portion, much enlarged, non-poriferous face, to show the zigzag interstices and hexagonal fenestrules.
- Fig. 3.* *Glauconome elegantula*, R. Eth., Lower Carboniferous Limestone group, Harelaw Quarry, Haddingtonshire; poriferous face, somewhat enlarged.
- Fig. 4.* A portion of fig. 3, much enlarged.
- Fig. 5.* Another specimen of the same, striated or non-poriferous face, nat. size., Harelaw Quarry, Haddingtonshire.
- Fig. 6.* A portion of fig. 5, much enlarged.

(I am indebted to Mr. Wilson for the drawings.)

* Sitz. d. k.-k. Akad. d. Wissenschaften zu Wien, 1875, lxxi.